State of Maine
Substance Abuse Treatment Needs Assessment

Prevention   **Treatment**

Intervention

Study 3: **Estimating Need for Treatment or Intervention Among Youth in Maine Counties: A Synthetic Estimation Approach**

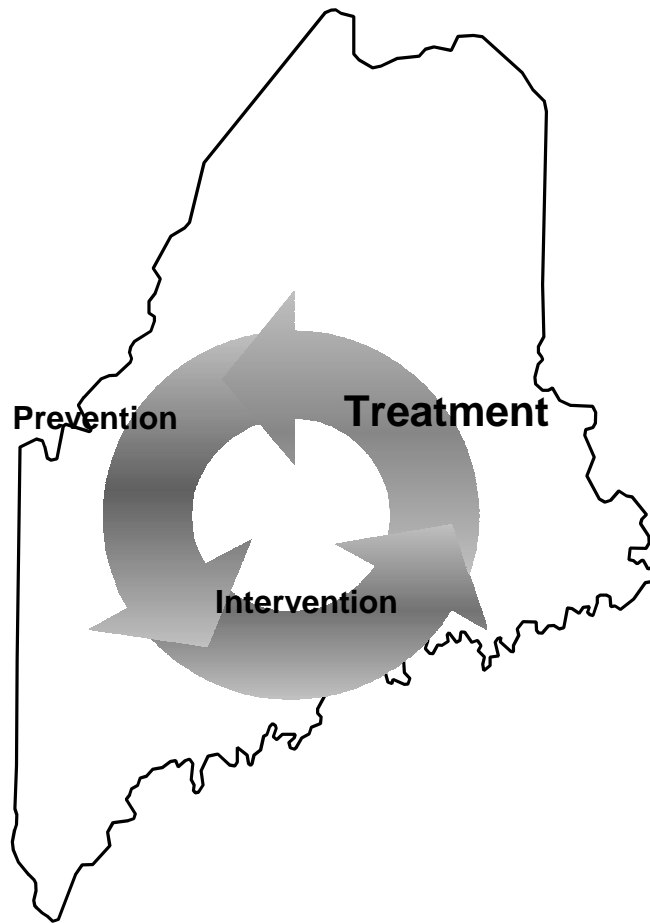CSAT
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Abuse Treatment
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State of Maine
Substance Abuse Treatment Needs Assessment

Study 3: Estimating Need for Treatment or Intervention Among Youth in Maine Counties: A Synthetic Estimation Approach

FINAL REPORT

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Executive Summary

Prepared by

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Introduction and Approach

This report presents findings from a study utilizing synthetic estimation to simulate the number of Maine adolescents aged 12 to 17 years old in each county who are at risk for or in need of substance abuse treatment or intervention. Data readily available to the public were used in this study. Data sources include the 1997 National Household Survey on Drug Abuse, the nation's largest study of alcohol and drug use, as well as Maine-specific social indicator data describing the socio-demographic characteristics of each county. The specific variables and outcomes are as follows:

Socio-Demographic and Behavioral Variances (See Section 2.2.2 and 2.3.4 for definitions of these variables.)

- arrest rates (alcohol law violations, violent crimes, property crimes, nonindex crimes);
- high school dropout status;
- ethnicity;
- gender;
- urban residence;
- past year substance abuse treatment;
- past year move; and
- family income below the poverty level.

Alcohol and Drug-Related Outcome Measures

- drank 5 or more drinks on 5 or more occasions in the past 30 days;
- drank 5 or more drinks at least once in the past month;
- got drunk five or more times in the past year;
- experienced negative consequences associated with drinking in the past year;
- need alcohol treatment or intervention;
- used illicit drugs in the past year;
- used illicit drugs in the past month;
- used illicit drugs frequently in the past year;
- experienced negative consequences associated with illicit drug use in the past year;
- need drug treatment or intervention.

The first step in creating the synthetic estimation model was to assess the individual-level relationships between the indices of alcohol and drug use and the demographic and behavioral information. Using statistical models, we explored the approximate effect of each of the demographic and behavioral indicators (i.e., arrest record, dropout status) on the probability that an adolescent used alcohol or drugs, experienced problems associated with alcohol or drug use, or was in need of alcohol or drug treatment or intervention. The 1997 National Household Survey on Drug Abuse data for 12 to 17 year olds were used for this purpose. The results of these individual-level models were applied to corresponding county-level social indicators.

The second step involved using the models to calculate rates of alcohol and drug use and need for treatment or intervention based on county-level characteristics. Differences across counties in the estimates of alcohol and drug-related measures are tied directly to differences in the socio-demographic characteristics (i.e., juvenile arrest rate, poverty level, high school dropout rate) of each county.

Highlights of Findings: Overall Models

Predictors of Alcohol Problems

Among adolescents aged 12 to 17, the two most significant predictors of heavy alcohol use were having been arrested for an alcohol-related violation in the past year and having dropped out of high school. The probability of drinking 5 or more drinks on five or more occasions increased by 12.2% when adolescents had been arrested for alcohol violations. Additionally, alcohol violations were associated with a 24% increase in the outcome of drinking 5 or more drinks at least once in the past month and a 40% increase in the outcome of getting drunk 6 or more times in the past year. Dropping out of school was associated with a 9.8% increase in the probability of drinking 5 or more drinks at least 5 times in the past month; a 25% increase in the likelihood of drinking 5 or more drinks at least once in the past month; and a 28.7% increase in the outcome of getting drunk at least 6 times in the past year. Other important predictors of heavy drinking include having been to substance abuse treatment in the past year, past-year arrests for crimes other than alcohol violations, having moved in the past year, and living in an urban area. In addition, white males were more likely to be heavy drinkers.

Arrests for alcohol violations were also among the strongest predictors of negative consequences and need for alcohol treatment or intervention. Past-year history of alcohol violations was correlated with a 69.1% increase in the probability of experiencing negative consequences and a 71.5% increase in the likelihood of needing treatment or intervention for alcohol-related problems. Past-year substance abuse treatment, past-year other arrests, and high school dropout status were also significantly associated with negatives consequences and need for treatment or intervention.

Figure ES.1 Predictors of Problem Alcohol Use: The Percent Increase or Decrease in the Probability of Experiencing an Outcome Relative to the Comparison Group

Legend:
- □ Got drunk on 5 or more occasions in past year
- ▨ Evidence of negative consequences
- ■ Need for alcohol treatment or intervention

Y-axis: Percentage (%) or increase in probability

X-axis categories: Moved, Treatment, Alcohol Violations, Property Arrest, Dropout, Urban
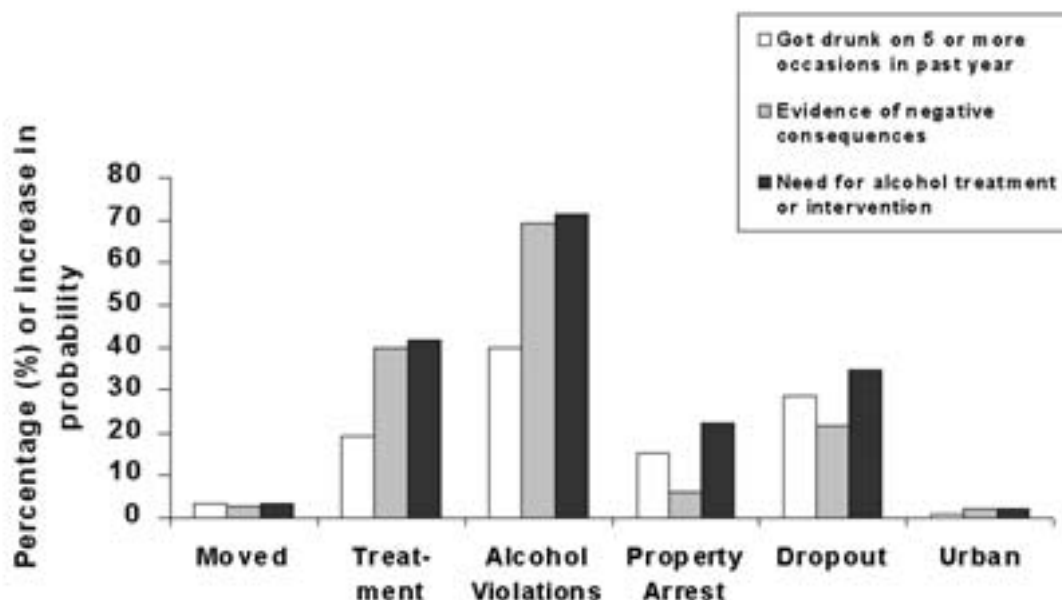
Predictors of Illicit Drug Use and Need for Treatment or Intervention

Similar to the findings for alcohol outcomes, being arrested was a strong predictor of annual or monthly illicit drug use. However, arrests for past-year property or nonindex[1] crimes were equivalent to or stronger predictors than alcohol violations for measures of past year or past month illicit drug use. For example, arrests for property crimes were associated with a 50% increase in the likelihood of using drugs in the past year compared to those not arrested for property crimes, while arrests for nonindex crimes and property crimes were related to a 24% and 21% increase in the probability of using drugs in the past month as compared with non-arrested adolescents. Individuals who dropped out of school, who were arrested for alcohol violations in the past year, who had substance abuse treatment in the past year; who were arrested for property or nonindex crimes in the last 12 months, or who had moved within the last 12 months were more likely to be frequent users. Living in an urban area also slightly increased the risk of illicit drug use.

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[1]Nonindex crimes are those not included under AOD, property, or violent crimes, such as assault, fraud, vandalism, etc.

Alcohol violations and high school dropout status were the most significant predictors of negative consequences associated with illicit drug use and need for drug intervention or treatment. Other variables associated with an increase in the probability of drug-related problems or need for treatment included having had a past year episode of substance abuse treatment; dropping out of high school; being arrested for a property, nonindex, or violent crime in the past year; and having moved in the past year.

Figure ES.2 Predictors of Drug Use: The Percent Increase or Decrease in the Probability of Experiencing an Outcome Relative to the Comparison Group
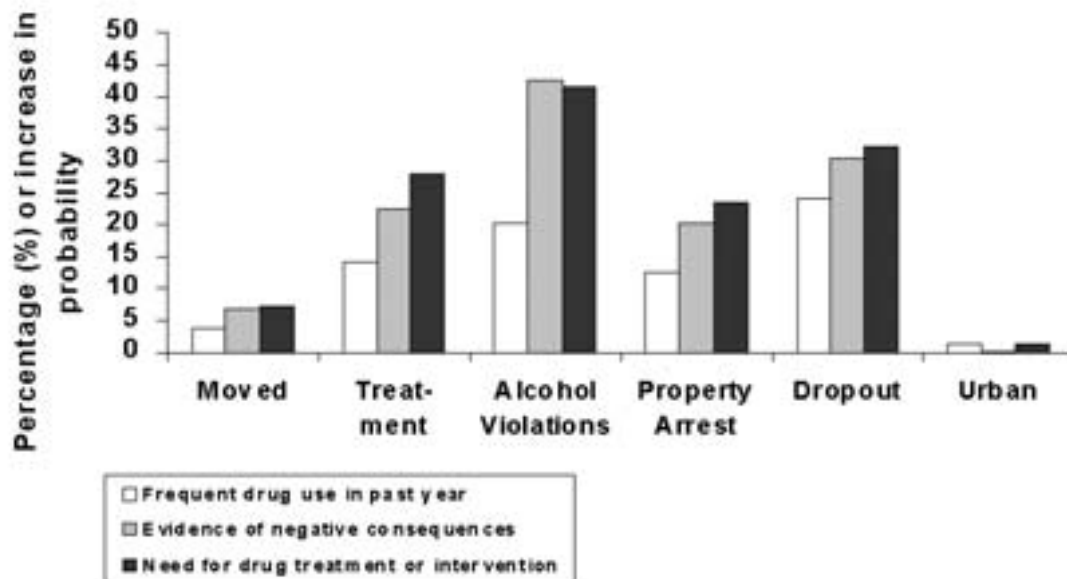

Legend:
☐ Frequent drug use in past year
☐ Evidence of negative consequences
■ Need for drug treatment or intervention

Prevalence of Alcohol Outcomes and Number in Need of Services for Maine

Using the results from the individual-level models and applying these to each Maine county using the value of the corresponding county-level social indicators (i.e., socio-demographic characteristics), we calculated the alcohol and drug outcomes in each county and statewide. The lowest and highest prevalence rate of the 16 counties and the state average for each of the measures are presented below.

Prevalence of Alcohol Outcomes

	Drank $\geq$ 5 drinks $\geq$ 5 times in the past month	Drank $\geq$5 drinks $\geq$1 times in the past month	Got drunk $\geq$5 times in past year	Negative consequences associated with drinking	Need for alcohol treatment or intervention
State Average	**0.72%**	**2.68%**	**3.61%**	**4.23%**	**7.08%**
Minimum	0.51%	2.37%	3.26%	3.73%	6.30%
Maximum	1.04%	3.16%	4.23%	5.06%	8.42%

- Estimates indicated that in Maine less than 1% of adolescents drank 5 or more drinks, five or more times in the past month; however, 2.68% drank heavily at least once in the past month and 3.61% got drunk at least 5 times in the past year. On average, approximately 4% experienced negative consequences associated with their drinking and 7% were in need of alcohol treatment or intervention due to the serious nature of their alcohol use.

- Differences among counties in the prevalence of alcohol outcomes were limited by lack of variance in the socio-demographic characteristics. However, prevalence rates concerning alcohol use were up to 2 times higher in some counties than others.

Figure ES.3 Predicted Prevalence of Alcohol Outcomes: Lowest Prevalence, Highest Prevalence, and State Average Across all 16 Counties
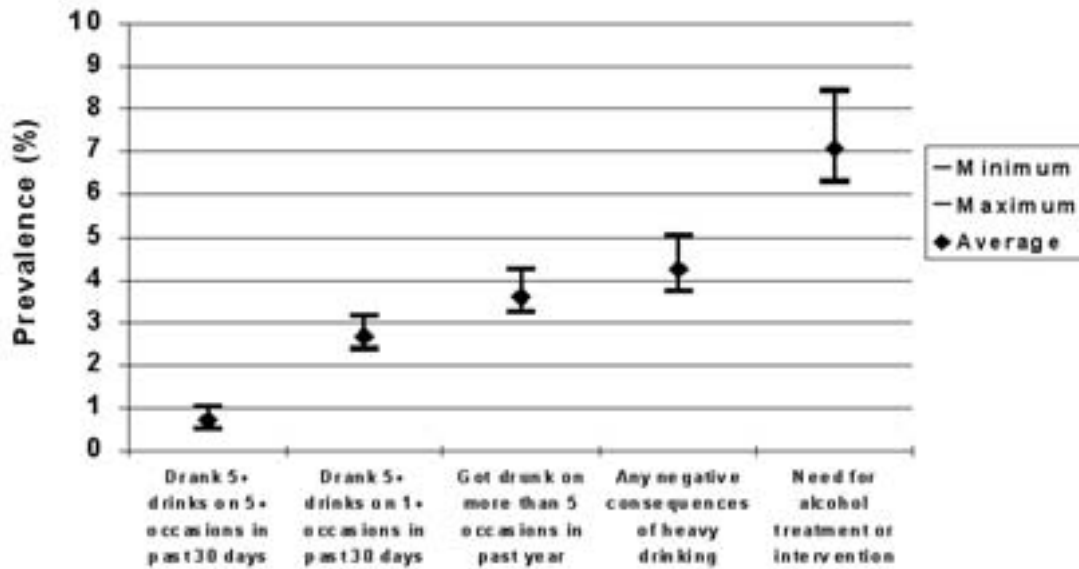
Number in Need of Alcohol Services by County

Despite the relatively low variability in the prevalence estimates, differences in county population counts of youth contributed to differences in the number of adolescents in need of alcohol treatment or intervention. The number in need was low in counties such as Franklin and Piscataquis and much higher in counties such as Cumberland, Penobscot, and York.

Figure ES.4 Predicted Counts of 12 to 17 Year-Olds Needing Alcohol Treatment or Intervention in Maine, by County
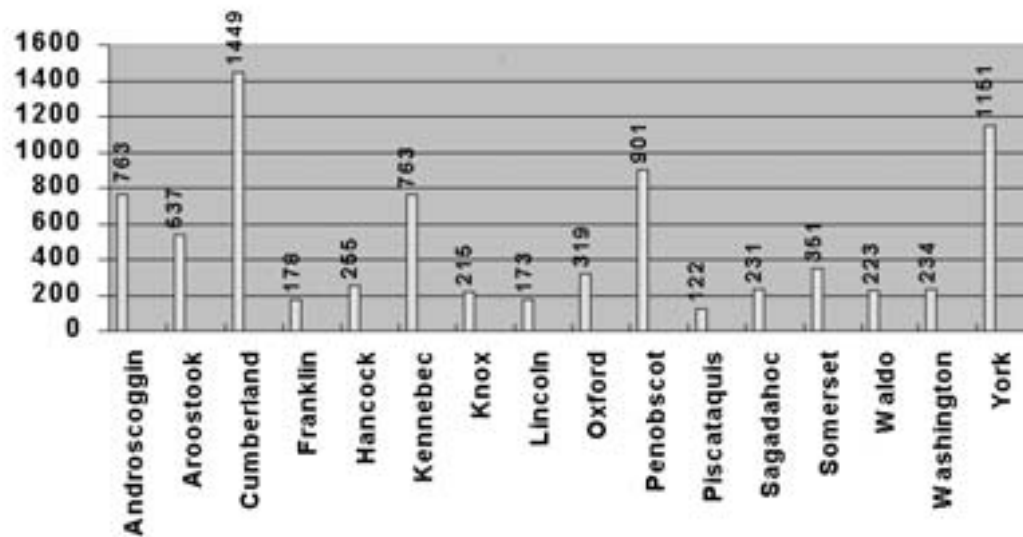
Prevalence of Drug Outcomes and Number in Need of Services

Prevalence of Drug Outcomes

	Used illicit drugs in past year	Used illicit drugs in past month	Frequent drug use in past year	Negative consequences associated with drug use	Need for drug treatment or intervention
State Average	**7.91%**	**0.96%**	**0.99%**	**1.65%**	**1.60%**
Minimum	6.59%	0.74%	0.78%	1.51%	1.38%
Maximum	9.99%	1.33%	1.31%	1.92%	1.95%

● As indicated by results of the synthetic estimation model, approximately 8% of Maine teens tried an illicit drug in the past year. A much smaller proportion (0.96%) used illicit drugs in the past month or were frequent users (0.99%). Negative consequences of drug use were estimated to occur among 1.65% of adolescents, while 1.60% were believed to be in need of some form of treatment or intervention to address compulsive drug use.

● Counties varied somewhat in their estimates of adolescent drug use. Some counties were estimated to have drug outcomes 1.3 to 1.8 times higher than others.

Figure ES.5 Predicted Prevalence of Drug Use Measures: Lowest Prevalence, Highest Prevalence, and State Average Across all 16 Counties
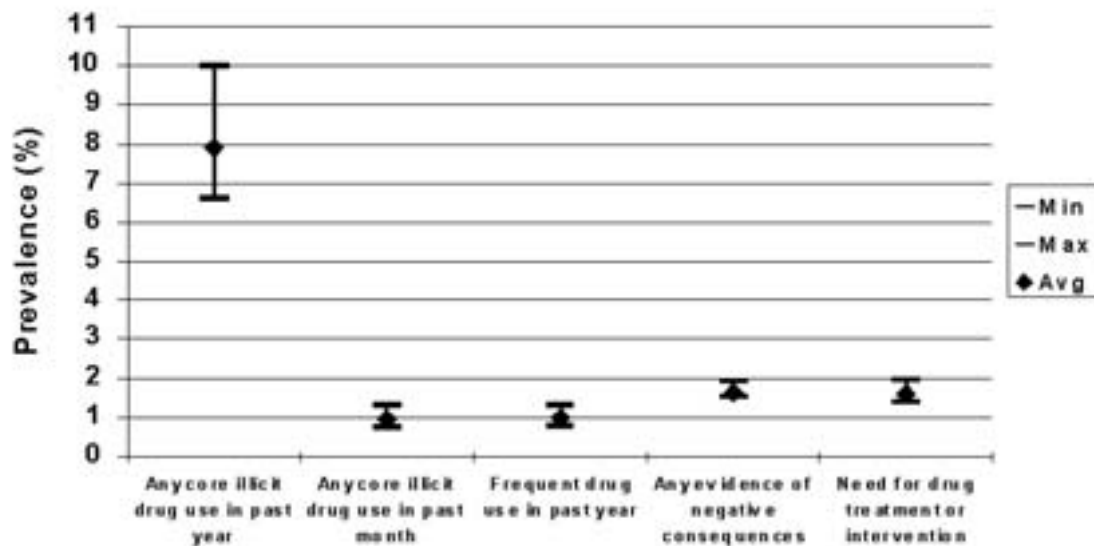
Number in Need of Drug Services by County

Again, despite relatively low variability in drug prevalence rates, the number of adolescents in need of treatment by county varied significantly. Counties that were high on need for alcohol services, such as Cumberland, Penobscot, and York, were also high on need for drug services. Similarly, counties with lower estimates of alcohol treatment/intervention need (i.e., Franklin, Piscataquis) also had lower estimates of need for drug services relative to other counties.

Figure ES.6 Predicted Counts of 12 to 17 Year-Olds Needing Drug Treatment or Intervention in Maine, by County
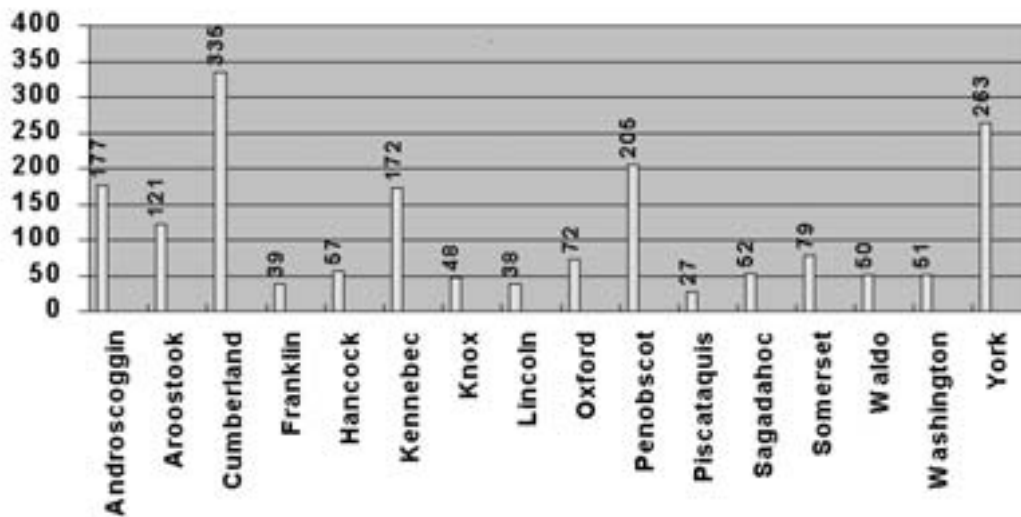
Total Counts of Adolescents in Need of Alcohol or Drug Treatment or Intervention, by County

The numbers of adolescents who needed either alcohol or drug intervention or treatment were calculated for each county. These numbers control for the number of youth who have both alcohol and drug problems. As such, the numbers presented in Figures 4 and 6 will not sum to those depicted in Figure 7. The highest counts of youth in need of substance abuse services were in Cumberland County (1,479), followed by York County (1,171), and Penobscot County (913). Consequently, these are also the counties with the highest youth population counts.

Figure ES.7 Predicted Counts of 12 to 17 Year Olds Needing Alcohol or Drug Treatment or Intervention in Maine, by County

County	Count
Androscoggin	783
Aroostook	543
Cumberland	1479
Franklin	179
Hancock	257
Kennebec	772
Knox	216
Lincoln	173
Oxford	321
Penobscot	913
Piscataquis	123
Sagadahoc	234
Somerset	365
Waldo	225
Washington	237
York	1171
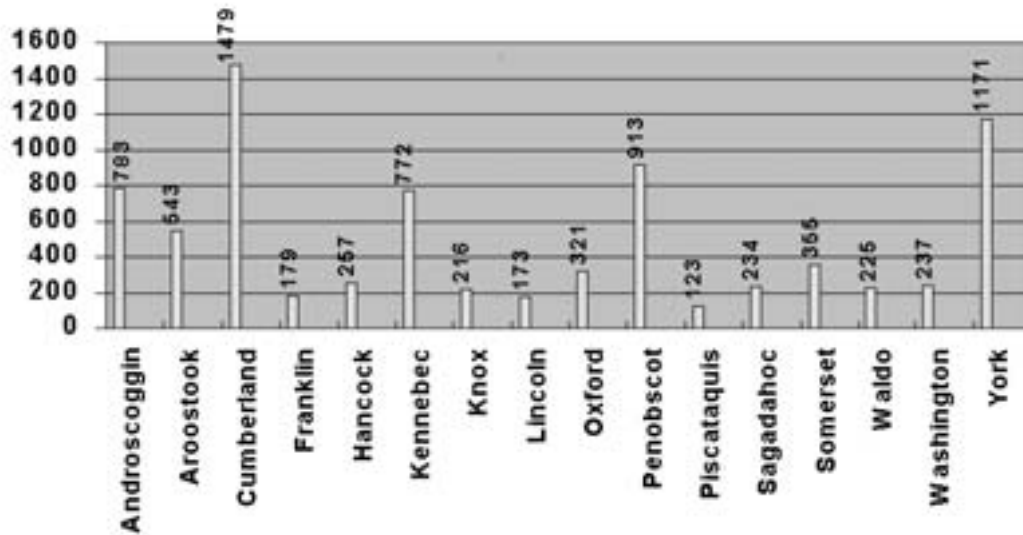
Overall, the estimated totals for substance abuse service needs *statewide* are as follows:

- 7,981 youth aged 12 to 17 statewide are estimated to need substance abuse (alcohol or drug) treatment or intervention services;

- 1,786 youth aged 12 to 17 statewide are estimated to need drug treatment or intervention services; and

- 7,865 adolescents aged 12 to 17 statewide are predicted to need alcohol treatment or intervention services statewide.

Figure ES.8 Statewide Counts of Youth Aged 12 to 17 in Need of Alcohol or Drug Treatment or Intervention Services
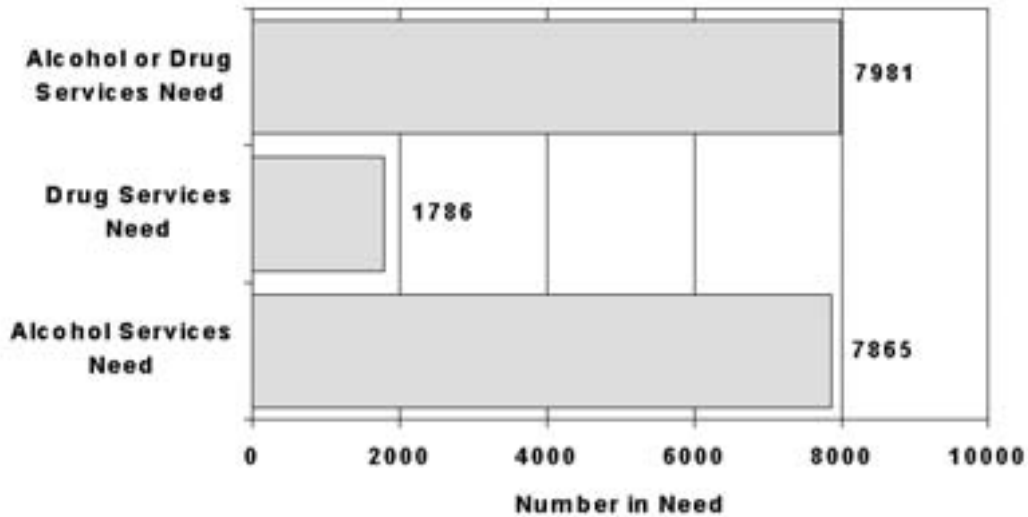
Summary and Implications

This study describes a method of using archival social indicator and substance use data to estimate alcohol and drug use, problem use, and need for treatment for adolescents in Maine aged 12 to 17. By creating mathematical models incorporating information on socio-demographics and adolescent alcohol and drug use, we estimated the percentage of Maine teens in each county who used drugs, drank heavily, had negative consequences associated with alcohol or drug use, or who may be in need of substance abuse treatment or intervention. Overall, 7.08% of adolescents were determined to be in need of alcohol treatment or intervention while a much smaller proportion, 1.60%, were estimated to need drug treatment/intervention. Thus, teen drinking appears to be a much more widespread problem than drug use, although an estimated 8% of Maine adolescents have tried an illicit drug within the past year. Estimates of substance use and need for treatment varied slightly across counties, with some counties having prevalence rates 2 times higher than others on specific outcomes.

This study suggests that several socio-demographic variables including juvenile arrest rate, substance abuse treatment history, dropout status, urbanicity, recent residential move, and ethnicity are important predictors of alcohol and drug use outcomes. Furthermore, differences in these socio-demographic variables are useful for identifying variation in substance use and non-use rates across counties. However, given the homogeneity in population characteristics across the state of Maine, variation in substance use prevalence outcomes was somewhat limited. It is likely that states with more diverse populations would show greater differences in county-level prevalence rates. However, the number of youth in a county needing intervention or treatment services for alcohol and drug abuse is a function not only of the prevalence rate but the population counts of youth in a county. Thus, counts of adolescents in need of substance abuse services did vary greatly by county, mostly as a function of the size of the youth population base.

Results from this study may be useful for identifying counties or regions with greater numbers of youth using alcohol or drugs or experiencing substance abuse problems, thus allowing more targeted application of prevention and treatment services in areas with higher need. Findings may also be helpful in identifying specific youth in need of services based on characteristics known to be associated with an increased risk for substance abuse problems such as school dropouts or youth having problems with the law. This study may serve as one of many useful tools in prevention and treatment planning and resource allocation decisions. Despite its limitations, the cost savings of employing a synthetic estimation approach over large-scale, representative surveys may be substantial.

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1. INTRODUCTION

Substance abuse has been called the Nation's number one health problem. Numerous studies have documented the negative consequences associated with substance abuse among adolescents, including suicidal behavior,[1] delinquency and violence,[2] and high-risk sexual behaviors.[3] Although difficult to treat, substance abuse is not intractable. Research shows that treatment of substance abuse can reduce or eliminate use and the symptoms associated with abuse.

Given the high prevalence and devastating impact of substance abuse, reducing drug and alcohol use and abuse is a high priority for federal, state, and local governments. At the federal level, the focus is shifting, with increased emphasis being placed on efforts targeted at adolescents. At the state and local levels, developing and targeting effective treatment and intervention strategies and evaluating their impacts require credible information on the extent of alcohol and drug use among adolescents.

The state of Maine seeks systematic information about the nature, severity, and range of substance abuse problems among various subgroups, including adolescents, in order to improve planning of treatment and intervention services. With funding from the Center for Substance Abuse Treatment (CSAT), the Maine Office of Substance Abuse (OSA) undertook a series of needs assessment studies to gather information on the extent of alcohol and other drug use and the need for substance abuse services among residents of the state.

One study conducted as part of the Maine needs assessment project is Estimating Need for Treatment or Intervention Among Youth in Maine Counties: A Synthetic Estimation Approach. This study uses model-based synthetic estimation to determine the need for treatment or intervention for alcohol and drug abuse on the part of adolescents aged 12 to 17 at both the state and county level. This study was carried out for OSA by Research Triangle Institute (RTI).

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[1]See Berman & Schwartz, 1990; Burge, Felts, Chenier, & Parrillo, 1995; Crumley, 1990; Felts, Chernier, & Barnes, 1992; Garrison, McKeown, Valois, & Vincent, 1993; Harrison & Luxenberg, 1995; Windle & Windle, 1997; Woods et al., 1997.

[2]See Donovan & Jessor, 1985; DuKarm, Byrd, Auinger, & Weitzman, 1996; Ellickson, Saner, & McGuigan, 1997; Elliott, Huizinga, & Menard, 1989; Hundleby, 1987; Osgood, Johnston, O'Malley, & Bachman, 1988.

[3]See Donovan & Jessor, 1985; Donovan, Jessor, & Costa, 1988; Fortenberry, 1997; Hundleby, 1987; Ketterlinus, Henderson, & Lamb, 1990; Orr, Beiter, & Ingersoll, 1991.

This report presents the findings from this study. This chapter provides an overview of the various studies being conducted to assess the demand for alcohol and illicit drugs and the need for treatment services in Maine along with a description of this particular study. Chapter 2 details the methodology used to conduct this study, including the data sources, selection of variables, and modeling procedures. Chapter 3 provides results of the data analysis, and Chapter 4 summarizes the findings and discusses the study limitations and implications.

1.1 Overview of the State Needs Assessment Project

The Maine demand and needs assessment family of studies is designed to provide a valid and reliable database of information to facilitate short- and long-term planning and to aid in implementing services to meet population needs effectively and efficiently. The specific objectives of the project are to:

- develop statewide, substate, and county-level estimates of the need for treatment for problems related to the abuse of alcohol and other drugs for the total population and for key subgroups;

- determine the extent to which these needs are being met by the current treatment system;

- develop low-cost, valid methodologies that can be used by the state in subsequent years to estimate treatment needs; and

- identify key gaps in Maine's current data collection efforts relating to needs assessment.

The demand and needs assessment project consists of six studies designed to achieve these goals. These studies were selected to achieve broad coverage of the state's population, to provide reliable information on met and unmet treatment needs, and to develop tools that can be used by the state in the future for estimation and planning purposes. The project includes a range of methodologies, including telephone interviewing, computer-assisted personal interviewing (CAPI), record abstraction, analytic modeling, and integrative analyses, which together provide a comprehensive base of information that Maine can use to continue to improve its efforts to meet the alcohol and drug abuse treatment needs of its population. The six studies are as follows:

- Study 1: Alcohol and Other Drug Household Estimates;

- Study 2: Use of Alcohol and Illicit Drugs and Need for Treatment Among Maine Adult Arrestees;

- Study 3: Estimating Need for Treatment or Intervention Among Youth in Maine Counties: A Synthetic Estimation Approach;

- Study 4: Using Social Indicators to Estimate Substance Use and Treatment Needs in Maine;

- Study 5: Assessment of Maine's Substance Abuse Treatment System: Structure, Capacity and Utilization, 1997;

- Study 6: Integrated Population Estimates of Substance Abuse Treatment and Intervention Needs in the state of Maine.

Independently and together, these studies offer an important knowledge base for Maine to improve its efforts to meet treatment needs and to allocate resources.

1.2 Overview of Study 3: Estimating Need for Treatment or Intervention Among Youth in Maine Counties: A Synthetic Estimation Approach

Knowing the relative level of the need for treatment or intervention across counties will help Maine to plan and allocate the treatment and intervention services necessary to reach the adolescents who need them. To this end, three major goals of this study are to:

1. summarize the use of, and current thinking behind, model-based synthetic estimation approaches to treatment needs assessment;

2. develop and describe a methodology for generating model-based estimates; and

3. provide county-level indirect estimates of the number of adolescents in need of substance abuse treatment or intervention.

This study is especially significant because it is the only study within the needs assessment project that generated estimates of substance use and treatment needs among adolescents for each county in the state. In the remainder of this section, we address the first goal by describing two possible approaches for conducting this study (including the strengths and limitations of each), as well as the approach developed specifically for this study.

1.2.1 Overview of Possible Approaches

The general goal of needs assessment studies is to determine the types, number, and geographic distribution of individuals needing services. Needs assessments can employ both direct and indirect methods of gathering information. Direct methods include conducting field

surveys to ascertain the number of youths in the population who meet diagnostic or other designated criteria of need. However, primary data collection generally involves high cost and considerable time commitments and has its own particular methodological weaknesses (e.g., potential underreporting of undesirable or illegal behaviors such as drug use).

Indirect methods to estimate service needs include social indicator modeling and synthetic estimation. These procedures are both commonly used in small area estimation and were reviewed in a recently completed report that used social indicator modeling to estimate treatment needs among Maine adults (Herman-Stahl et. al., 1998). For that study, models based on various social, demographic, and economic characteristics of counties were developed to generate estimates of adult needs for treatment and intervention for substance abuse for every county in the state. The criteria used to develop the models were county-level prevalence estimates derived from a statewide household telephone survey of adults residing in Maine.

Because adolescents were not included in the household telephone survey, social indicator models could not be developed for estimating treatment or intervention needs for this population. Synthetic estimation offers an alternative approach, in which findings from drug use surveys conducted on larger populations (e.g., national surveys) are extrapolated to the target areas, adjusting for differences in the distributions of basic demographic characteristics such as age, race/ethnicity, and gender (Rhodes, 1993). As discussed by Herman-Stahl and colleagues (1998), however, traditional synthetic estimation approaches require population data on the numbers of individuals in each target geographic area for each cell of the cross-classified demographic characteristics. Such cross-classified counts are typically available only for age, race, and gender. Other potentially more important characteristics upon which to base estimates of treatment or intervention needs are thus excluded from the estimation process.

1.2.2 Description of Approach Developed for Assessment of Treatment Needs Among Adolescents

An alternative method to traditional social indicator and synthetic estimation procedures, and the method selected for this study, is *model-based synthetic estimation*. This strategy offers a viable and more appealing alternative to traditional synthetic estimation approaches, without being overly complicated or expensive. This study makes use of survey data from the 1997 National Household Survey on Drug Abuse (NHSDA), as well as the social indicator data collected for Study 5 of Maine's demand and needs assessment project. A brief discussion of this approach follows; however, more detailed information is available in Chapter 2.

The NHSDA includes a number of sociodemographic variables believed to be predictive of substance use for youths aged 12 to 17 years. Data on some of these variables are available at the county level in Maine through archival sources. The list of sociodemographic variables collected from NHSDA respondents for which there is a corresponding county-level measure includes gender, race/ethnicity, high school dropout status, poverty status, arrest record, and urbanicity.

This list of variables offers a considerably more promising set of constructs from which to estimate variability in county-level prevalence rates than the limited set of age, race, and gender data, on which synthetic estimation is often based. However, a traditional synthetic estimation approach cannot possibly be applied using all these variables because archival data that enumerate the population for every cell based on cross-classification are simply not available. In traditional approaches, separate estimates from a large survey are developed for each cell of the cross-classification, applied to the age, race, and gender distributions in each target area, and then recombined into a total population estimate for each area. In the approach developed for this study, we have instead developed statistical models based on the NHSDA to estimate the independent relative effect of each sociodemographic predictor whether or not the respondent's family income is below the poverty level. These effects are then applied to corresponding measures at the county level (e.g., the percentage of children living in poverty) and summed across the entire set of predictor variables. Conceptually, the difference between this model-based approach and the traditional method is that this approach uses a larger and more potent set of predictor measures but only considers each measure's main (or overall) effect rather than any specific interaction effects among predictors.

We believe that this approach offers a promising alternative for providing estimates at the local level when other techniques are simply not feasible due to limitations in data availability or sample sizes. Although this approach is experimental, we believe it is conceptually sound and can serve as a prototype for a more general application of model-based synthetic estimation procedures to treatment needs assessment.

2. MODEL-BASED SYNTHETIC ESTIMATION METHODS

2.1   Overview

The overall goal of this study was to develop county-level indirect estimates of the number of Maine adolescents in need of substance abuse treatment or intervention or at high risk of needing intervention. To accomplish this goal, we made use of readily available county-level social indicator data and individual-level data from the National Household Survey on Drug Abuse (NHSDA).

Synthetic estimates of alcohol and drug use and the need for treatment or intervention were created using a two-step process. First, we estimated the relationship between substance use outcome measures and demographic and behavioral variables with individual-level data for youths aged 12 to 17 from the NHSDA. Specifically, we developed a set of probit models based on NHSDA data using a set of predictors. Then, we applied the results of these NHSDA models to the corresponding county-level social indicators. The social indicator data were used to enumerate either the excess or deficient number of youths in the subgroups defined by each indicator, relative to the state average. By summing these positive and negative values across the entire set of social indicators, we could then estimate the total difference in the number of users from our base estimate and add this number to the base estimate to arrive at a final county-specific estimate.

In this section, we present details on the methodology used to derive the findings in this report. First, we present a description of the data sources, followed by a description of the variables selected for use in this study, details on the individual-level modeling procedures used, and finally a description of how individual-level modeling results were extrapolated to the county level.

2.2   Data Sources

Data for this study were collected from two sources, the NHSDA and the county-level social indicator database developed for Study 4 of the Maine demand and needs assessment project. Each of these data sources is described below.

2.2.1   National Household Survey on Drug Abuse

The NHSDA is the primary source of statistical information on the use of illicit drugs in the United States. Conducted by the federal government since 1971 (and sponsored by the Substance Abuse and Mental Health Services Administration [SAMHSA] since 1992), the

survey collects data by administering questionnaires to a representative sample of the U.S. population in their homes. The NHSDA surveys residents of households, noninstitutional group quarters (e.g., shelters, rooming houses, and dormitories), and civilians living on military bases. Persons excluded from the survey include homeless people who do not use shelters, active military personnel, and residents of institutional group quarters such as jails and hospitals.

The NHSDA interview takes an average of 1 hour to complete and uses self-administered answer sheets for the most sensitive portions of the interview. Use of these self-administered answer sheets is designed to maximize honest reporting of illicit drug use and other sensitive behaviors. The self-administered section includes questions on the recency and frequency of use of various licit and illicit drugs, opinions about drugs, problems associated with drug use, perceived need and demand for drug abuse treatment, and drug abuse treatment experience. Also collected in interviewer-administered portions are data on demographic characteristics, employment, education, income, health status, adult mental health issues, health insurance, use of health services, and access to health care.

This report uses data from the 1997 NHSDA, which employed a multistage area probability sample of 24,505 persons interviewed during 1997. This sample represents a response rate of 78.3% of the set of individuals initially selected for interview. A total of 7,844 adolescents aged 12 to 17 were interviewed, yielding a response rate of 83% among this age group. The survey design oversampled blacks, Hispanics, and young people in order to improve the accuracy of estimates for these populations. All individual-level analyses include weights to control for oversampling.

2.2.2   County-Level Social Indicator Database

The county-level data used in this study were obtained from a previously developed database of county-level "social indicators." This database was initially created to support a social indicator modeling approach for estimating treatment needs among adults. The adult social indicator report, which is available from the Maine Office of Substance Abuse (OSA), DMHMRSAS, contains a thorough description of how and why the indicators were collected (Herman-Stahl et al., 1998).

The county-level data in the social indicator database were collected from a variety of state and federal agencies (see Appendix A). Data obtained in hardcopy form were keyed into an electronic file and verified for accuracy, while data obtained in electronic format were spot-checked for consistency. After the data were screened and edited (with guidance from the source agency), the county-level data files were stored in a SAS® database. Although most indicators

were available at the county level, several had to be aggregated before inclusion in the database. The indicators from the database that were used for this study are displayed in Table 2.1.

Table 2.1   Social Indicators Used in Study 3: Estimating Need for Treatment or Intervention Among Youth in Maine Counties: A Synthetic Estimation Approach

Social Indicator	Year
Juvenile arrest rate for alcohol law violations (aged 10 to 17)	1990-94
Juvenile arrest rate for violent index crimes (aged 10 to 17)	1990-94
Juvenile arrest rate for property index crimes (aged 10 to 17)	1990-94
Juvenile arrest rate for nonalcohol/drug, nonindex crimes (aged 10 to 17)	1990-94
Juvenile enrollment in state-supported alcohol or drug treatment programs (aged 17 or younger)	1990-93
Percentage of population who moved in past 5 years (all ages)	1990
Percentage of population who are white males (aged 10 to 19)	1990-94
Percentage of population who are black females (aged 10 to 19)	1990-94
Percentage of population who are black males (aged 10 to 19)	1990-94
Percentage of population who are nonwhite, nonblack females (aged 10 to 19)	1990-94
Percentage of population who are nonwhite, nonblack males (aged 10 to 19)	1990-94
Percentage of population living in urban areas (total population)	1990
Percentage of population living below the poverty level (total population)	1990
High school dropout rate (students enrolled in grades 9 through 12)	1989-93

Source: Estimating Need for Treatment or Intervention Among Youth in Maine Counties: A Synthetic Estimation Approach: 1999.

In addition to the social indicators described above, population estimates were also obtained from the U.S. Bureau of the Census (Appendix A). These estimates were based on the 1990 Decennial Census and included 18 age groupings for six race and gender categories. From these data, we created the appropriate population denominators for calculating the final indicator values.

After the social indicator and population data were collected and entered into the database, indicator rates were calculated. Rates and percentages were calculated as an aggregate of all available data years. Some indicators were only available for 1 year (1990), but the majority of the final indicator rates were based on 5 years of data (1990-94). The final county-level social indicator data set included the county name and final indicator rates.

2.3   Selection of Variables

2.3.1   Alcohol Outcome Measures

To characterize alcohol consumption, we created five dichotomous indicator variables. Three of these measures indicate heavy use, one indicates that the youth experienced negative consequences from alcohol use, and one indicates a need for treatment or intervention. Each of these measures is described below.

Heavy Alcohol Use—Measure 1. The first measure of heavy alcohol use was defined as consumption of five or more drinks of alcohol on five or more occasions in the past month. This measure of heavy alcohol use is similar to the measure used in the adult household and social indicator studies (Herman-Stahl et al., 1998; Kroutil et al., 1998), which defined heavy alcohol users as men who had five or more drinks (or women who had four or more drinks) in a 24-hour period on 4 or more days in the past month.

Heavy Alcohol Use—Measure 2. The second measure of heavy alcohol use was defined as consumption of five or more drinks of alcohol on one or more occasions in the past month.

Heavy Alcohol Use—Measure 3. The third measure of heavy alcohol use was defined as getting drunk on more than five occasions in the past year.

Negative Consequences of Alcohol Use. Several questions from the NHSDA questionnaire were designed to measure problems resulting from alcohol use. We categorized youths as having experienced negative consequences from their alcohol use if they reported any of the following in the past year:

- spending a great deal of time getting alcohol, using alcohol, or getting over its effects during a period of a month or more;

- using alcohol much more often or in larger amounts than intended;

- having built up a tolerance to alcohol so that the same amount had less effect than before;

- wanting or unsuccessfully trying to stop or cut down on alcohol use;

- having experienced any health problems as a result of alcohol use (e.g., liver disease, stomach disease, pancreatitis, tingling feet, numbness, memory problems, an accidental overdose, a persistent cough, a seizure, hepatitis, or abscesses);

- avoiding school, work, or recreational activities because of alcohol use; or

- having experienced any emotional or psychological problems as a result of alcohol use.

This variable is similar to a measure of symptoms of dependency used in the adult household and social indicator studies. The adult household survey instrument, however, contained a more complete set of questions on symptoms of dependence (nine items) from the third, revised edition of the <u>Diagnostic and Statistical Manual of Mental Disorders (DSM-III-R)</u> (American Psychiatric Association [APA], 1987). The NHSDA included only four of the <u>DSM-III-R</u> (1987) symptoms of dependence, along with three additional questions indicating other types of problems resulting from use.

Need for Alcohol Treatment or Intervention. Adolescents were categorized as needing alcohol treatment or intervention if they:

- were heavy alcohol users according to either measure 1 or measure 3 (i.e., having drunk five or more drinks on five or more occasions in the past month or having been drunk on more than five occasions in the past year) or

- experienced any negative consequences from alcohol use.

Again, we attempted to make this variable as analogous as possible to the measure of need for alcohol services used in the adult household and social indicator studies. In those earlier studies, individuals were classified as needing services if they reported any of the nine symptoms of dependence in the past 12 months or if they reported heavy alcohol use (for the aforementioned single measure of heavy alcohol use utilized in those studies).

2.3.2   Illicit Drug Outcome Measures

To characterize drug consumption, we created five additional dichotomous indicator variables. Two of these measures indicate any illicit drug use, one indicates frequent use, one indicates the presence or absence of negative consequences from illicit drug use, and one indicates the need for treatment or intervention. These measures are described below.

Any Illicit Drug Use.   "Core" illicit drug use was defined as any use of marijuana or hashish, hallucinogens, cocaine in any form (including crack), or heroin or other opiates at least once in the time period of interest. In this report, we defined this indicator of illicit drug use for

two time periods—**past year** and **past month**. Both of these measures are comparable to those used in the adult household study.

Frequent Drug Use. We also defined a measure of frequent illicit drug use. Specifically, youths were categorized as frequent users if they reported weekly use of marijuana or monthly use of cocaine, hallucinogens, or heroin in the past year. This measure is similar to the measure of a "problem" pattern of use developed for the adult household study. In that study, however, individuals who reported any use of cocaine or heroin or other opiates in the past year were categorized as having a problem pattern of use.

Negative Consequences of Drug Use. This gauge is similar to the measure of negative consequences of alcohol use described above, except that is defined for core illicit drug use.

Need for Drug Treatment or Intervention. The variable representing a need for treatment or intervention was defined using our measure of frequent drug use and our measure of negative consequences from drug use. Specifically, youths were categorized as in need of drug treatment or intervention if they reported:

- frequent drug use or

- experiencing at least one of the negative consequences of drug use.

Again, we attempted to make this variable as similar as possible to the measure of need for drug services used in the adult household and social indicator studies. In those studies, individuals were classified as needing drug services if they reported any of the nine symptoms of dependence in the past 12 months or if they reported a problem pattern of drug use (i.e., weekly use of marijuana or hallucinogens in the past year or any use of cocaine, heroin, or other opiates in the past year).

2.3.3 Need for Alcohol or Drug Treatment or Intervention Measure

Finally, a variable representing a need for alcohol or drug use intervention for *either* was created to examine the overlap between heavy or problematic alcohol use and frequent or problematic drug use. The difference between the predicted need for alcohol *or* drug intervention and the predicted need for alcohol intervention indicates the extent to which frequent drug consumption occurred separately from heavy alcohol consumption.

2.3.4 Selection of Variables for Individual-Level Prediction Model

Because synthetic estimates rely on both individual-level data from the NHSDA and social indicator data, a variable must exist in both data sources for it to be in the synthetic estimation process. A strong predictor in the NHSDA that does not have an analogue in the county-level social indicator data cannot be used at the county-level prediction stage. Similarly, predictors at the county level that are not also available in the NHSDA (e.g., percentage of single-parent households) cannot be related to alcohol and drug use measures in the individual-level modeling stage. Given this constraint, we examined all the available social indicator data for Maine and attempted to find analogous variables in the NHSDA, in which the data are much more extensive.

The variables that are defined in both data sources are listed below. Variables in the individual-level NHSDA are listed first, with corresponding aggregate variables used in the county-level simulations indicated in parentheses. The county-level variables are discussed in more detail in Appendix A.

- gender-race interactions (white males, black males, black females, other males, other females; white females do not appear in several tables as they were used as the reference group in the analysis);

- past year high school dropout status (percentage of high school students who dropped out during the past year);

- family income below the federal poverty level (percentage of families living below the federal poverty level);

- past year arrest for an alcohol law violation (juvenile arrest rate for alcohol law violations);

- past year arrest for a violent index crime (juvenile arrest rate for violent index crimes);

- past year arrest for a property index crime (juvenile arrest rate for property index crimes);

- past year arrest for a nonindex, nonalcohol or drug crime (juvenile arrest rate for nonindex, nonalcohol/drug crimes);

- lives in an urban area (percentage of the total population living in an urban area);

- past year treatment for alcohol or drug use (percentage of juveniles enrolled in state-supported alcohol or drug treatment programs); and

- moved in the past year (percentage of the total population who moved in the past 5 years, divided by 5).

Because each of these variables was statistically significant at the 10% level in at least two of the 15 predictive models, we used all of these variables as predictors in all of the models.

2.4 Individual-Level Modeling Procedures

As stated earlier, the first step in creating synthetic estimates of alcohol and drug outcomes for adolescents involved an analysis of individual-level data. We used information on sociodemographic characteristics and alcohol and drug consumption of respondents in the 1997 NHSDA. The sample includes between 7,151 and 7,484 respondents, depending on the outcome being examined.

We used multivariate probit models to estimate the relationship between the set of predictor variables described in Section 2.3.4 and each of the 11 measures of alcohol and drug use and intervention need described in Sections 2.3.1 through 2.3.3. For each alcohol and drug outcome, the models provide estimates for each predictor variable of the percentage point change in the probability that the outcome occurred resulting from a change in the dichotomous predictor from 0 to 1. (This change is known as the marginal effect.)

For example, we can examine the effect that dropping out of high school in the past year has on the probability that an adolescent had five or more drinks on five or more occasions in the past month (all other factors remaining constant). The result for this particular example indicates that past year high school dropouts were 9.8 percentage points more likely than nondropouts to have had five or more drinks on five or more occasions in the past month. The estimations correctly omit exactly one category from a broad set of categories. The estimated effects for each variable represent the net increase or decrease in the expected probability of the outcome relative to the omitted category or "reference group." In this example, the reference group is nondropouts. A similar exercise can be performed for each of the predictor variables and for each of the alcohol and drug outcomes. The estimated parameters of the individual models are discussed in Section 3.1.

2.5 Extrapolation of Individual-Level Modeling Results to County-Level Indicator Data

Once models were estimated for the 11 outcome measures described in Sections 2.3.1 through 2.3.3, we simulated the rates of alcohol and drug use and need for intervention corresponding to these measures for each county in Maine. To understand the underlying methodology, first consider predicting alcohol and drug outcomes in the original NHSDA sample. For probit models, the estimated contribution of each predictor variable to the alcohol or drug outcome of one individual in our NHSDA sample would be determined by multiplying the estimated marginal effect of the predictor by the specific value of that predictor.[1] The sum of these estimated contributions (along with the constant term) is a predicted probability between 0 and 1 that the given outcome takes place for that individual.

To simulate rates of alcohol and drug use/need for intervention in Maine counties, we substituted the values of the Maine social indicators for the values of the corresponding predictor variables from NHSDA. The predictors from the NHSDA are all dichotomous variables that can only take on values of 0 or 1. Each social indicator variable represents the county-level analogue to the corresponding predictor variable from the NHSDA, which is a percentage between 0 and 1. To continue the previous example, the estimated marginal effect of the high school dropout indicator can be multiplied by the percentage of high school students in the county who dropped out of school during the past year, rather than a 0 or 1 corresponding to whether an individual from the NHSDA sample dropped out in the past year. If that variable takes on a value of 20% (0.2), for instance, then the contribution of dropping out of high school to drinking five or more drinks on five or more occasions is $0.2 * 0.098 = .0196$. In other words, the percentage of individuals predicted to drink five or more drinks on five or more occasions is about 2 points higher in that particular county than in an otherwise identical county with no past year high school dropouts.

For each county in Maine, we calculated averages for each social indicator that corresponded to a predictor in the individual-level models. Then, for each county and each alcohol and drug outcome, the exercise described above was repeated to generate a predicted contribution for each of these social indicators. For each outcome and county, summing across these predicted contributions yielded a predicted value for that outcome and county. This prediction is an estimate of the percentage of adolescents in the county who experience that alcohol or drug outcome. These predicted rates are called synthetic estimates because they

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[1]Because we are predicting alcohol and drug use patterns for Maine rather than the nation as a whole, we include indicators in our model for the region of the country and use the North Atlantic region as the reference group.

simulate what the rates would be if the demographic characteristics of the NHSDA sample changed to match the county-level data. Variation in the social indicator variables from county to county generates variation in the predicted rates of alcohol and drug use/need for intervention across counties.

3. RESULTS

3.1   Individual-Level Model Results

To illustrate the relative importance of each of the predictors for the various alcohol and drug use measures, we report the results of the individual-level NHSDA models in Tables 3.1 through 3.3. To make the results easier to interpret, we report the marginal effects from the probit models, which give the effect of a change in the predictor variable from 0 to 1 on the probability of change in the dependent variable. For convenience in terminology, these marginal effects can be expressed as percentage points simply by multiplying them by 100. For example, Table 3.1 indicates that those arrested for an alcohol law violation in the past year were 12.2 percentage points more likely to have had five or more drinks on five or more occasions in the past month.

Table 3.1 presents the results for the five alcohol measures. Across the five models, the predictors that had the most consistent and significant correlations with drinking were dropping out of high school, receiving treatment for alcohol or drug use, and being arrested for crimes other than violent offenses. As expected, each of these variables was positively correlated with heavy drinking. Not surprisingly, being arrested for an alcohol violation was uniformly significant and had the largest marginal effect in four of the five models. Individuals who had moved in the past year also were more likely to drink heavily than those who had not moved, though the magnitude of the relationship was much smaller than for the variables just mentioned. In addition, blacks of both genders were less likely (than white females) to drink heavily. Nonwhite/nonblack females also were less likely than white females to engage in some types of heavy drinking, while white males were more likely to have had five or more drinks on at least one occasion and on five or more occasions in the past month. Finally, urban residents were more likely than others to have had at least five drinks on at least five occasions in the past month, while those living in families with incomes below the poverty level were less likely than others to suffer negative consequences from drinking and to be classified as needing intervention for drinking.

Comparable analyses for the individual-level models of illicit drug use are summarized in Table 3.2. Once again, dropping out of high school, receiving treatment for alcohol or drug use, being arrested for crimes other than violent offenses, and moving in the past year were each strongly associated with illegal drug use and a need for drug intervention. Additionally, those who had been arrested for a violent crime were more likely to suffer negative consequences from illegal drug use and to need treatment or intervention for drug use. Urban residence was positively associated with drug use, which may be related to the relative accessibility of drugs in

Table 3.1   Individual Models of Alcohol Measures—Marginal Effects

Predictor	Drank 5+ Drinks on 5+ Occasions in the Past Month	Drank 5+ Drinks on 1+ Occasions in the Past Month	Got Drunk on 6+ Occasions in the Past Year	Evidence of Negative Consequences	Need for Treatment or Intervention
White Male	0.011*	0.028***	0.003	-0.009	-0.005
Black Female	-0.012	-0.043***	-0.030**	-0.030	-0.050**
Black Male	-0.008	-0.026*	-0.031**	-0.049***	-0.055***
Other Female	-0.024***	0.013	-0.058***	0.049	0.037
Other Male	0.005	0.006	-0.019	-0.011	0.004
Below Poverty Level	0.005	-0.008	-0.006	-0.036**	-0.035**
Urban Resident	0.013**	0.013	0.010	0.022	0.022
Moved	0.020***	0.019	0.035***	0.027*	0.035*
Alcohol/Drug Treatment	0.021	0.127***	0.194***	0.397***	0.418***
High School Dropout	0.098***	0.250***	0.287***	0.215***	0.348***
Alcohol Violation Arrest	0.122***	0.240***	0.400***	0.691***	0.715***
Index—Property Arrest	0.020	0.150***	0.152***	0.059	0.221***
Index—Violent Arrest	0.036	0.034	0.061	0.113	0.050
Nonalcohol/drug, Nonindex Arrest	0.058**	0.118***	0.125***	0.301***	0.353***
N	7,279	7,279	7,309	7,339	7,151
Adjusted R^2	0.111	0.091	0.113	0.099	0.098

*Statistically significant at the 10% level.

**Statistically significant at the 5% level.

***Statistically significant at the 1% level.

Source: Estimating Need for Treatment or Intervention Among Youth in Maine Counties: A Synthetic Estimation Approach: 1999.

Table 3.2   Individual Models of Drug Measures—Marginal Effects

Predictor	Any Core Illicit Drug Use in the Past Year	Any Core Illicit Drug Use in the Past Month	Frequent Drug Use in the Past Year	Evidence of Negative Consequences	Need for Drug Treatment or Intervention
White Male	-0.002	0.010	0.002	-0.003	0.001
Black Female	-0.037*	-0.025*	-0.018*	-0.020	-0.030*
Black Male	-0.013	0.004	-0.006	-0.005	-0.008
Other Female	0.114*	0.005	-0.025	-0.004	-0.008
Other Male	-0.042	-0.040*	0.006	-0.033	-0.030
Below Poverty Level	-0.026	-0.006	0.009	-0.020	-0.014
Urban Resident	0.034**	0.027**	0.014*	0.003	0.014
Moved	0.078***	0.056***	0.038***	0.068***	0.073***
Alcohol/Drug Treatment	0.464***	0.123***	0.142***	0.225***	0.279***
High School Dropout	0.346***	0.174***	0.244***	0.305***	0.323***
Alcohol Violation Arrest	0.373***	0.165**	0.203***	0.426***	0.414***
Index—Property Arrest	0.500***	0.213***	0.126***	0.202***	0.235***
Index—Violent Arrest	0.029	0.074	0.055	0.176**	0.177**
Nonalcohol/drug, Nonindex Arrest	0.369***	0.240***	0.116***	0.179***	0.180***
N	7,484	7,484	7,484	7,428	7,439
Adjusted R^2	0.116	0.111	0.148	0.123	0.121

*Statistically significant at the 10% level.
**Statistically significant at the 5% level.
***Statistically significant at the 1% level.

Source: Estimating Need for Treatment or Intervention Among Youth in Maine Counties: A Synthetic Estimation Approach: 1999.

urban areas. Black females were less likely to use drugs than white females, but there was little variation in drug use among other race-gender groups and across poverty status.

Table 3.3 presents the results for the model predicting the need for intervention for either alcohol or drugs. The parameters of this model are quite similar to those of the need for alcohol intervention model.

Table 3.3 Alcohol or Drug Intervention Need Measure—Marginal Effects

Predictor	Need for Alcohol or Drug Treatment or Intervention
White Male	0.000
Black Female	-0.064***
Black Male	-0.044**
Other Female	0.069
Other Male	-0.015
Below Poverty Level	-0.037**
Urban Resident	0.025
Moved	0.055***
Alcohol/Drug Treatment	0.463***
High School Dropout	0.442***
Alcohol Violation Arrest	0.689***
Index—Property Arrest	0.351***
Index—Violent Arrest	0.060
Nonalcohol/drug, Nonindex Arrest	0.382***
N	7,167
Adjusted R^2	0.103

*Statistically significant at the 10% level.
**Statistically significant at the 5% level.
***Statistically significant at the 1% level.

Source: Estimating Need for Treatment or Intervention Among Youth in Maine Counties: A Synthetic Estimation Approach: 1999.

Finally, the adjusted R^2 values essentially indicate the percentage of the variation in the outcome variables explained by the predictor variables. The low adjusted R^2 values of between 9% and 15% are misleading for two reasons. First, regressions in individual-level data with large sample sizes, such as the NHSDA sample, typically yield low R^2 values. Therefore, these R^2 values are more an indication of the type of data used to estimate the model than an implication

that important predictors have been left out of the model (though this may also be true, given the constraints imposed by the availability of social indicator data). Second, because of the binary nature of the outcome variable, the adjusted R^2 value in the probit models cannot in practice approach the theoretically perfect value of 1.

3.2   County-Level Estimates of the Prevalence of Alcohol and Drug Use

3.2.1   Overview

Using the results from these individual-level models, we calculated county-level estimates for each of the alcohol and drug outcomes. Table 3.4 gives an indication of the ranges of the values of the social indicator variables substituted into the models from Tables 3.1 through 3.3 to predict county-level alcohol and drug outcomes. The first column indicates the mean value across counties for each of the social indicator variables. On average, less than 2% of the population in Maine counties are nonwhite, and about one third live in urban areas. About one eighth of the population in an average county live below the poverty level, 9% have moved in the past year, and about 3.4% of high school students have dropped out in the past year. Arrest rates are low, particularly for alcohol violations and violent crimes.

The figures in the last column of Table 3.4 indicate the difference between the maximum and minimum values of each social indicator, which are given in the second and third columns. Multiplication of the range by the marginal effects reported in Tables 3.1 through 3.3 indicates the variability across counties in predicted alcohol and drug use outcomes induced by variation in the values of the predictors. For instance, compare the impacts of urban residence and high school dropout on the synthetic estimates of past year illicit drug use. The magnitude of the marginal effect of high school dropout is an order of magnitude larger than that of the urban residence. However, in the social indicator data, the range of values across counties for urban residence is more than 25 times that of the high school dropout percentage. Therefore, the variability in predicted alcohol and drug outcomes across counties that is associated with differences in urban residence rates is actually larger than that associated with differences in high school dropout rates.

3.2.2   Alcohol

Table 3.5 reports the predicted prevalence rates of alcohol outcomes for each county along with the average, minimum, and maximum of each of these rates. The predicted prevalence of teens who have had five or more drinks on five or more occasions in the past month was 0.72% on average, with a range of 0.51% to 1.04%. The average estimated percentage of teens who have had five or more drinks at least once in the past month was nearly

Table 3.4   County-Level Variables—Summary Statistics

Predictor	Mean	Maximum	Minimum	Range
White Female	47.64%	50.19%	45.13%	5.06%
White Male	50.53%	52.41%	48.56%	3.85%
Black Female	0.18%	0.56%	0.00%	0.56%
Black Male	0.22%	0.50%	0.00%	0.50%
Other Female	0.71%	2.76%	0.20%	2.57%
Other Male	0.71%	2.92%	0.23%	2.69%
Below Poverty Level	12.04%	19.30%	6.83%	12.47%
Urban Resident	33.13%	67.88%	0.00%	67.88%
Moved	9.01%	10.59%	7.60%	2.98%
Alcohol/Drug Treatment	0.91%	2.05%	0.31%	1.75%
High School Dropout	3.39%	4.47%	1.96%	2.51%
Alcohol Violation Arrest	0.44%	0.99%	0.16%	0.83%
Index—Property Arrest	2.69%	4.86%	1.25%	3.61%
Index—Violent Arrest	0.09%	0.17%	0.03%	0.14%
Nonalcohol/drug, Nonindex Arrest	2.72%	6.71%	0.87%	5.85%

Source: Estimating Need for Treatment or Intervention Among Youth in Maine Counties: A Synthetic Estimation Approach: 1999.

four times as large as the percentage who drank that much on at least five occasions in the past month. The estimated prevalence of getting drunk on more than five occasions in the past year was over one third higher on average. An even larger number of teens were predicted to experience negative consequences of drinking. On average, more than 4% of Maine teens were estimated to have had at least one problem relating to alcohol consumption, such as spending a great deal of time using alcohol or getting over its effects, drinking more than they intended to, or trying unsuccessfully to cut down. This rate was above 5% in one county. Finally, because teens need to meet only one of the two conditions for heavy drinking other than measure 2 (drinking five or more drinks on at least one occasion in the past month) *or* show evidence of a negative consequence of drinking to be classified as needing intervention for drinking, the predicted prevalence of this measure was larger than that of the other measures. The average prevalence of this measure was at least two thirds higher than that of any of the three individual measures taken independently, implying that a substantial fraction of teens who have gotten drunk several times in the past year did not report having any alcohol-related problems.

Table 3.5 Predicted Prevalence and Number of Alcohol Outcomes for Maine Counties

County	Drank 5 or More Drinks on 5 or More Occasions in the Past 30 Days %	No.	Drank 5 or More Drinks on 1 or More Occasions in the Past 30 Days %	No.	Got Drunk on More Than 5 Occasions in the Past Year %	No.	Evidence of Negative Consequences %	No	Need for Alcohol Treatment or Intervention %	No.
Androscoggin	1.04	94	3.16	287	4.23	383	5.06	459	8.42	763
Aroostook	0.74	56	2.68	202	3.59	270	4.30	324	7.13	537
Cumberland	0.87	167	2.91	556	3.85	735	4.56	872	7.59	1,449
Franklin	0.58	16	2.45	67	3.33	92	3.84	106	6.49	178
Hancock	0.63	24	2.55	97	3.49	133	3.99	152	6.72	255
Kennebec	0.82	85	2.79	290	3.72	387	4.45	462	7.35	763
Knox	0.70	21	2.65	79	3.61	108	4.28	128	7.15	215
Lincoln	0.51	14	2.37	65	3.26	90	3.73	103	6.30	173
Oxford	0.61	30	2.50	122	3.41	167	3.85	189	6.52	319
Penobscot	0.82	102	2.78	347	3.69	459	4.35	543	7.23	901
Piscataquis	0.61	11	2.51	46	3.45	64	3.92	72	6.61	122
Sagadahoc	0.81	24	2.89	85	3.90	115	4.72	140	7.80	231
Somerset	0.71	36	2.67	134	3.62	181	4.17	209	6.99	351
Waldo	0.63	21	2.53	86	3.45	117	3.87	132	6.57	223
Washington	0.54	19	2.52	88	3.33	116	3.93	137	6.73	234
York	0.85	126	2.91	434	3.88	579	4.66	695	7.72	1,151
State	0.72	846	2.68	2,985	3.61	3,996	4.23	4,723	7.08	7,865
Minimum	0.51	11	2.37	46	3.26	64	3.73	72	6.30	122
Maximum	1.04	167	3.16	434	4.23	579	5.06	872	8.42	1,449

Source: Estimating Need for Treatment or Intervention Among Youth in Maine Counties: A Synthetic Estimation Approach: 1999.

Because the range across counties in values for most of the social indicators was narrow, as Table 3.4 indicates, the variation across counties in predicted prevalence rates for alcohol outcomes was small. For outcomes other than drinking five or more drinks on five or more occasions in the past month, the maximum predicted prevalence rate was only about a third higher than the minimum predicted prevalence rate.

3.2.3   Illicit Drugs

Synthetic estimates for illicit drug use based on the individual-level NHSDA analyses are summarized in Table 3.6. The predicted prevalence of adolescents who have used any marijuana, cocaine, heroin, or hallucinogens in the past year is listed in the first column and reveals a statewide average of nearly 8%. The average predicted prevalence of illicit drug use in the past month was only about one eighth of this figure, or less than 1%. The estimated percentages of teens who are frequent drug users (i.e., weekly marijuana users or monthly cocaine, heroin, or hallucinogen users) and past month users were about the same. The variation in these outcomes across counties was somewhat larger than that for the majority of the alcohol use outcomes.

The predicted prevalence of experiencing negative consequences from drug use, such as school or work being affected by drug use, wanting to quit using drugs but not being able to do so, experiencing emotional problems as a result of drug use, or using drugs in larger quantities than intended, averaged 1.65% statewide. This average was about two thirds larger than that of past month drug use or frequent past year drug use but only about 20% of that of past year drug use. Therefore, many past year users did not report negative consequences, but many teens who reported negative consequences either were not past month users or were not frequent users. The variation across counties in this outcome was quite low, never falling below 1.5% or exceeding 2%.

Unlike the analogous results for heavy alcohol use, predicted rates of drug intervention need were virtually identical to predicted rates of experiencing negative consequences from drug use. Because intervention need was defined to reflect either frequent drug use or negative consequences of drug use, the predicted rates indicate that virtually all teens who report problems related to their drug use are frequent drug users. In fact, the average rate of intervention need was slightly lower than that of experiencing negative consequences. This apparent logical inconsistency can be explained by the lack of precision of the individual models estimated from the NHSDA. Table 3.2 shows that for drug use the estimated marginal effects are quite similar for the intervention need and negative consequence outcomes. Therefore, the slight increase in imprecision in explaining the need for intervention compared to explaining evidence of negative

Table 3.6   Predicted Prevalence and Number of Drug Use Outcomes for Maine Counties

County	Any Core Illicit Drug Use in the Past Year		Any Core Illicit Drug Use in the Past Month		Frequent Drug Use in the Past Year		Evidence of Negative Consequences		Need for Drug Treatment or Intervention	
	%	No.	%	No.	%	No.	%	No.	%	No.
Androscoggin	9.99	905	1.33	121	1.31	118	1.92	174	1.95	177
Aroostook	8.10	610	1.00	75	1.02	77	1.64	124	1.61	121
Cumberland	8.85	1,690	1.13	217	1.13	215	1.75	335	1.75	335
Franklin	7.05	194	0.82	23	0.84	23	1.53	42	1.43	39
Hancock	7.30	278	0.86	33	0.90	34	1.61	61	1.51	57
Kennebec	8.38	870	1.06	110	1.06	110	1.67	173	1.66	172
Knox	8.01	240	0.97	29	0.98	29	1.66	50	1.60	48
Lincoln	6.59	181	0.74	20	0.78	21	1.51	41	1.38	38
Oxford	7.06	346	0.83	41	0.88	43	1.56	76	1.46	72
Penobscot	8.29	1,033	1.05	130	1.07	133	1.65	205	1.64	205
Piscataquis	7.13	132	0.82	15	0.90	17	1.56	29	1.48	27
Sagadahoc	8.83	261	1.10	32	1.10	33	1.81	54	1.78	52
Somerset	7.78	390	0.94	47	0.99	50	1.63	82	1.58	79
Waldo	7.11	242	0.84	29	0.91	31	1.56	53	1.47	50
Washington	7.32	255	0.82	28	0.89	31	1.57	55	1.47	51
York	8.84	1,318	1.13	168	1.11	165	1.80	268	1.76	263
State	7.91	8,945	0.96	1,118	0.99	1,130	1.65	1,822	1.60	1,786
Minimum	6.59	132	0.74	15	0.78	17	1.51	29	1.38	27
Maximum	9.99	1,690	1.33	217	1.31	215	1.92	335	1.95	263

Source: Estimating Need for Treatment or Intervention Among Youth in Maine Counties: A Synthetic Estimation Approach: 1999.

consequences, as shown in the slightly lower R^2 value for the intervention need model, may be sufficient to induce the very minor logical inconsistency embodied in the predicted prevalence rates for these two drug outcomes.

3.2.4 Need for Treatment or Intervention for Alcohol or Drugs

The predicted rates of need for treatment or intervention for either alcohol or drugs (see Table 3.7) were only slightly higher than those for alcohol treatment or intervention need by itself (see Table 3.5). This finding indicates that most adolescents who need intervention for their drug use also require intervention for their drinking.

Table 3.7   Predicted Prevalence and Number of Need for Treatment or Intervention for Alcohol or Drugs for Maine Counties

County	Need for Alcohol or Drug Treatment or Intervention	
	%	**No.**
Androscoggin	8.64	783
Aroostook	7.21	543
Cumberland	7.74	1,479
Franklin	6.51	179
Hancock	6.77	257
Kennebec	7.43	772
Knox	7.22	216
Lincoln	6.29	173
Oxford	6.56	321
Penobscot	7.33	913
Piscataquis	6.65	123
Sagadahoc	7.93	234
Somerset	7.07	355
Waldo	6.62	225
Washington	6.81	237
York	7.86	1,171
State	7.17	7,981
Minimum	6.29	123
Maximum	8.64	1,479

Source: Estimating Need for Treatment or Intervention Among Youth in Maine Counties: A Synthetic
        Estimation Approach: 1999.

3.2.5 Intervention Need by Dropout Status

Table 3.8 presents further results on the three need for intervention measures discussed earlier. Because past year high school dropout is an important predictor of all alcohol and drug measures and especially of these three need for intervention measures, we predicted separate rates of need for intervention for dropouts and nondropouts. These predictions were calculated using the estimated marginal effects presented in Tables 3.1 though 3.3, along with the following additional steps. First, models for the three need for intervention measures were re-estimated in the NHSDA using only teens who had not dropped out of school in the past year. The high school dropout indicator was excluded from these re-estimated equations. Then, the social indicator data were used to generate predicted rates of intervention need for nondropouts according to the algorithm presented earlier. Because the previously presented predicted rates for the entire adolescent population were simply weighted averages of the rates for nondropouts and dropouts (where the weights were the fraction of the adolescent population in each category), predicted rates for dropouts could then be imputed from the predicted rates for nondropouts and the adolescent population as a whole.

The weakness of this methodology is that the appropriate Maine social indicator data to substitute into the nondropout equation are those for nondropouts as a group rather than adolescents as a whole. Unfortunately, separate social indicator data for dropouts and nondropouts are unavailable. However, because only 3.4% of adolescents in Maine dropped out of high school in the past year, the values of the social indicators for the group of nondropouts should be quite similar to those of the combined sample, even if they are substantially different from those of dropouts as a group.

Table 3.8 indicates, as expected from the consistently large positive coefficient of the dropout indicator in the NHSDA models, much higher predicted rates of intervention needs for dropouts than for nondropouts. Need for intervention rates for dropouts were approximately three times as high for alcohol, five times as high for drugs, and four times as high for either alcohol or drugs as they were for nondropouts. On average, the synthetic estimates indicate that almost one fifth of Maine adolescents who have dropped out of high school need intervention for their drinking and almost one quarter need intervention for either alcohol or drugs. Keep in mind, however, that although these predicted rates are high, the number of high school dropouts in Maine is fairly low.

Table 3.8 Predicted Prevalence and Number of Intervention Need Measures for Maine Counties, by Dropout Status

County	Need for Alcohol Intervention–Nondropouts		Need for Alcohol Intervention–Dropouts		Need for Drug Intervention–Nondropouts		Need for Drug Intervention–Dropouts		Need for Alcohol or Drug Intervention–Nondropouts		Need for Alcohol or Drug Intervention–Dropouts	
	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.
Androscoggin	7.86	686	23.20	76	1.72	150	8.26	27	7.92	691	27.99	92
Aroostook	6.88	508	19.42	29	1.47	108	8.56	13	6.82	503	26.01	39
Cumberland	7.06	1,299	21.20	150	1.53	282	7.48	53	7.06	1,298	25.50	181
Franklin	6.26	169	17.74	10	1.29	35	8.29	4	6.14	165	24.82	13
Hancock	6.25	228	18.51	27	1.30	47	6.86	10	6.11	224	23.20	34
Kennebec	6.97	703	20.53	60	1.48	149	7.74	23	6.91	697	25.57	75
Knox	6.90	203	19.59	12	1.45	43	8.86	5	6.83	201	26.60	16
Lincoln	5.93	158	17.18	15	1.19	32	6.82	6	5.74	153	22.62	20
Oxford	6.04	284	17.99	35	1.25	59	6.61	13	5.90	277	22.53	44
Penobscot	6.76	812	20.19	89	1.44	173	7.17	32	6.70	805	24.54	108
Piscataquis	6.12	108	18.04	14	1.26	22	6.61	5	5.96	106	22.73	17
Sagadahoc	7.30	208	21.32	22	1.55	44	7.80	8	7.25	207	26.37	28
Somerset	6.47	311	19.14	39	1.36	65	6.89	14	6.36	306	23.75	49
Waldo	6.03	196	18.09	27	1.24	40	6.42	10	5.88	191	22.36	34
Washington	6.29	211	18.29	24	1.27	42	6.87	9	6.17	207	23.56	30
York	7.23	1,040	21.27	111	1.54	222	7.77	41	7.19	1,034	26.18	137
State	6.65	7,124	19.48	740	1.40	1,513	7.44	273	6.56	7,065	24.65	917
Minimum	5.93	108	17.18	10	1.19	22	6.42	4	5.74	106	22.36	13
Maximum	7.86	1,299	23.20	150	1.72	282	8.86	53	7.92	1,298	27.99	181

Source: Estimating Need for Treatment or Intervention Among Youth in Maine Counties: A Synthetic Estimation Approach: 1999.

4. DISCUSSION AND IMPLICATIONS

4.1   Summary of Findings

Using a combination of data from the National Household Survey on Drug Abuse (NHSDA) and from archival social indicator data to predict teen alcohol and drug use in Maine counties has proven to be a powerful estimation technique. The synthetic estimates illustrate that despite the homogeneity throughout the state in the values of many social indicators, rates of alcohol and illicit drug use vary somewhat across Maine counties. For alcohol, the most striking finding is that more than 7% of Maine teens were predicted to need intervention for their drinking because of either a pattern of getting drunk or having at least one problem relating to alcohol consumption. Meanwhile, we predicted that almost 8% of teens tried an illicit drug in the past year and slightly more than one fifth of these teens reported negative consequences as a result of their drug use. Our estimates indicate that although less than 1% of teens on average were either frequent drug users or past month drug users, almost twice as many teens were in need of drug intervention.

4.2   Limitations of the Study

Despite the usefulness of the synthetic estimation technique employed here, there are a number of limitations inherent to the methodology that could affect the validity of the predicted alcohol and drug outcomes. The main disadvantage is that the NHSDA sample from which the model parameters were estimated is not the same as the sample of Maine counties for which alcohol and drug use predictions were made. Many characteristics differ across the two samples. For instance, the NHSDA is a nationally representative data set of observations on individuals, while the social indicator data are defined over counties rather than individuals and confined to Maine. If important aggregate-level predictors have been omitted from the model, it is possible that the individual-level associations observed in the survey data do not hold true at the aggregate (i.e., county) level (Gove & Hughes, 1980; Robinson, 1950). Also, the age ranges for which the social indicator variables were calculated do not always match the 12- to 17-year-old age range of the NHSDA sample. Additionally, some variables are not defined in precisely the same way in both data sets. The preceding considerations reflect the experimental nature of the methodology used to estimate prevalence of substance use and need for treatment or intervention. We believe this approach provides estimates that are closer to the real values than other, less sophisticated approaches (e.g., estimating on a purely per capita basis). Nevertheless, the estimates provided in this report should be interpreted with caution and considered estimates rather than true values.

Another limitation involves the cross-sectional nature of the estimates. The model parameters indicate the expected impacts of changes in predictor variables across cross-sectional units (individuals or counties) on changes in alcohol and drug outcomes. Therefore, caution must be used in predicting the effect of changes over time in the social indicator variables on increases or decreases in alcohol and drug outcomes within counties. For instance, changes in high school dropout rates across counties may be correlated with other unmeasured factors that affect drug use. Although these factors vary across counties, they may vary little within a county over time (e.g., labor market opportunities).

In addition, we have assumed that the state of Maine is characterized by a single model describing the effect of each predictor variable on alcohol and drug outcomes, but it may be the case that model parameters in fact vary across areas within the state. For instance, Tables 3.1 and 3.2 indicate that urban residence is an important determinant of several alcohol and drug use outcomes, while Table 3.4 shows that large differences in urbanization levels exist across counties. It could be that changes in the level of urbanization necessary to induce a certain change in alcohol or drug use are larger in areas with higher urbanization levels. The same may hold for other significant determinants of alcohol and drug outcomes such as arrest rates and high school dropout rates, even though the variation across counties in these variables is not large.

Finally, some social indicators may potentially be measured inconsistently across counties. Even though the parameters of the model were not estimated from the county data, the predicted alcohol and drug outcomes may be systematically biased if such measurement variation is correlated with the true value of the indicator variable. For example, if the variation in measured arrest rates exceeds the actual variation in the underlying level of criminal activity, the variation in predicted alcohol and drug prevalence may be artificially inflated. Conversely, the opposite may be true if arrests are more likely to be recorded in counties with low arrest rates.

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APPENDIX A

Data Sources and Definitions

Data Sources and Definitions

The indicator data used for the analyses described in this report were obtained from a variety of sources by the Maine Office of Substance Abuse (OSA) and forwarded to the Research Triangle Institute (RTI) for cleaning, management, and analysis. This section describes the data sources and indicator definitions, summarizes data collection procedures, and notes any features of the data that may influence how they should be interpreted.

Uniform Crime Reporting (UCR)

Crime and arrest data are collected by the Federal Bureau of Investigation (FBI) from reports submitted by agencies participating in the UCR. The agency-level files are aggregated to the county level by the Inter-University Consortium for Political and Social Research (ICPSR). Arrest data must be interpreted cautiously for several reasons. First, the number of arrests almost always underestimates the true incidence of criminal activity because many crimes do not result in an arrest. Second, the likelihood of an arrest for a given crime may be influenced by local policies, police practices, and law enforcement resources. Third, if multiple crimes are involved, the arrest is classified according to the most serious crime committed only. Finally, not all agencies report data to the UCR and some agencies report only sporadically.

Adjustments have been made in the county-level files to compensate for nonreporting agencies. For UCR data through 1993, the number of arrests from agencies that reported between 6 and 11 months of information were weighted to produce 12-month equivalents. Agencies that reported fewer than 6 months for any given year were excluded from the aggregation. The estimated population counts covered by the excluded agencies also were excluded from the population denominators. Arrest rates were deemed unreliable and set to missing for any county in which the coverage index was less than .75.

In 1994, the ICPSR implemented a different algorithm to adjust for incomplete reporting. Data from agencies reporting 3 to 11 months of information were weighted to yield 12-month equivalents. Data for agencies reporting less than 3 months of data were replaced with data estimated by rates calculated from agencies reporting 12 months of data located in the agency's geographic stratum within their state. A coverage index for each county was constructed by ICPSR that reflected the degree to which data for that county were imputed. The index serves as a combined indicator of the total extent to which data for a given county have been imputed (as a result of agency data either being weighted to compensate for missing months or being replaced by stratum-wide estimates). For the purpose of the analyses used for this report, 1994 arrest rates were deemed unreliable and set to missing for any county in which less than 75% of the county's

population was covered by UCR reporting agencies. However, no counties fell below the threshold for reliability. Therefore, there were no missing arrest rates.

Data for jurisdictions located in multiple counties were reported in the county containing the largest component of the jurisdiction. Some jurisdictions such as state parks and some state police provide data only on a statewide basis. In these cases, data were allocated to counties proportionate to their share of the total state population of the agencies reporting information for 6 months or more. The percentage of arrests for any type of crime reported by statewide agencies was small or negligible and, thus, not a potentially significant source for bias in the county-level arrest rates.

For this report, UCR arrest data were used to construct the rate of juveniles aged 10 to 17 (per 1,000) who were arrested for alcohol law violations, violent crime, property crime, and nonalcohol and other drug (non-AOD) crime. Rates were based on a 5-year average (1990-94) and were calculated as 1,000 times the annual number of arrests divided by the estimated county population for each appropriate age group.

Some arrest categories were composed of several categories of crime. Juvenile alcohol law violations included operating under the influence (OUI), drunkenness, and liquor law violations. Violent crime included homicide, aggravated assault, and robbery while property crime included burglary, larceny, theft, arson, and motor vehicle theft. Non-AOD crime included assault, embezzlement, crimes against the family, forgery, fraud, gambling, disorderly conduct, other traffic offenses, prostitution, sex offenses, stolen property, suspicion, vagrancy, vandalism, weapons violations, running away, and curfew violations.

U.S. Bureau of the Census

Demographic data on age, race, gender, mobility, urbanicity, and poverty were obtained from the U.S. Bureau of the Census. These data were based on the Census Bureau's 1990 decennial survey of the U.S. population. The county-level data used for this study were abstracted from the *USA Counties 1994* and *USA Counties 1996* compact discs. Limitations of the Census data are that they are several years old and updated only every 10 years.

Mobility indicators included the percentage of the population that moved within the past 5 years from outside the county and within the same county. The percentage of the population living in urban areas was calculated by dividing the population living in areas defined as urban by the total population. Poverty measures were based on the percentage of all persons with 1989 incomes below the federal poverty threshold, defined as $12,674 for a family of four. A

percentage was calculated by dividing the total number of persons below the poverty threshold by the total number of persons for whom poverty status was determined.

Population data for 1990-94 also were obtained from the U.S. Bureau of the Census. These estimates were based on the 1990 decennial census. The population data included age groupings for six race and gender categories. Population totals for the following age groupings were provided for white males and white females, black males and black females, and other males and other females: 0 to 4, 5 to 9, 10 to 14, 15 to 19, 20 to 24, 25 to 29, 30 to 34, 35 to 39, 40 to 44, 45 to 49, 50 to 54, 55 to 59, 60 to 64, 65 to 69, 70 to 74, 75 to 79, 80 to 84, and 85 or older. Population data for persons aged 17 or younger also were obtained but did not include the race and sex categories.

The following indicators were created using these estimates:

- the percentage of the population who are males aged 10 to 19,
- the percentage of the population who are whites aged 10 to 19,
- the percentage of the population who are blacks aged 10 to 19,
- the percentage of the population who are white males aged 10 to 19,
- the percentage of the population who are black males aged 10 to 19,
- the percentage of the population aged 10 to 17, and
- the percentage of the population aged 10 to 19.

Because data were only available for 1990-94 and some indicators required denominators for 1995 and 1996, population figures for these years were imputed and based on prior data years. Imputations for 1995 were based on 1993 and 1994 data, while 1996 figures were calculated according to 1994 and the imputed 1995 data.

Maine Office of Substance Abuse

Providers who receive funding from OSA are required to submit Office of Substance Abuse Data System (OSADS) forms for each client they admit and discharge. These forms provide OSA with demographic, substance abuse, and treatment information. Each client is identified by a unique code (date of birth plus last four Social Security numbers) that provides unduplicated numbers of admissions.

Data for this study were available for 1990-93 and reflect admission by the county of the individual's residence, not by the county of admission. The data reflect those people admitted to state-funded substance abuse programs and those admitted into a program because of operating a vehicle under the influence (OUI). Defined as the unduplicated number of juveniles (aged 17

and under) in state-supported AOD programs, the rate was calculated as 1,000 times the number of juveniles in state-supported shelters, detox facilities, and regular AOD programs divided by the population aged 17 and under.

Maine Department of Education, Office of Management Information

The Maine Department of Education (DOE) receives a report (*Report of Public/Selected Private School Systems Part II, EF-M-35A Form*) from school superintendents by October 15 of each year. This report covers the previous school year of October 1 through September 30. The year begins October 1, when superintendents must report their total enrollment to the DOE. Superintendents then use that enrollment figure as their base number of students and count dropouts from that figure until September 30 of the following calendar year. For example, the report received by the DOE on October 15, 1997, depicted the number of students who had dropped out since October 1, 1996. Dropouts are reported by the grade level at the time of dropout. The DOE enters the dropout data from the EF-M-35A forms into the departmental school system's database.

Defined as the number of students in grades 9 through 12 who drop out of school in a single year without completing high school, data were available for school years 1989-90 through 1992-93. The dropout rate was calculated as 100 times the total number of dropouts in grades 9 through 12 divided by the total number of students enrolled in grades 9 through 12.

APPENDIX B

Explanation of Predicted Numbers of Adolescents Experiencing Alcohol and Drug Outcomes in Maine Counties

Explanation of Predicted Numbers of Adolescents Experiencing
Alcohol and Drug Outcomes in Maine Counties

The predicted numbers of adolescents are obtained for each county and outcome by multiplying the predicted prevalence of the outcome by the population of 12- to 17-year-olds in the county. The population of 12- to 17-year-olds is imputed by multiplying the population of 10- to 19-year-olds by 60%.

Table 3.5 indicates that nearly 8,000 12- to 17-year-olds in Maine were predicted to need intervention for their alcohol consumption. Table 3.6 shows that a slightly greater number, almost 9,000, were predicted to have used a core illegal drug at least once in the past year, although the number of adolescents needing intervention for drug use was less than 2,000. Naturally, the counts in Table 3.7 are virtually identical to those for alcohol intervention need in Table 3.5 because prevalence rates of intervention need for alcohol were almost the same as those for either alcohol or illegal drugs. Finally, Table 3.8 shows that even though rates of intervention need were much higher among high school dropouts than among nondropouts, the vast majority of individuals who need intervention for alcohol or drug use were nondropouts because there are so few high school dropouts in Maine.

APPENDIX C

Updating County and State Adolescent Treatment and Intervention Need Estimates

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In order to update the estimates presented in this report, please refer to the Excel Spreadsheet accompanying this report. The spreadsheet will automatically update the predicted number of adolescents in a county with a particular outcome (as well as this number expressed as a percentage of all adolescents in the county) when you enter new or updated data for a given year in each of the relevant cells.

The data to be entered into the spreadsheet to generate new estimates for adolescents ages 12 to 17 for each county are presented in Table 2.1 and are as follows:

- county population aged 12 to 17;
- number per thousand arrested and booked for OUI/drunkenness;
- number per thousand who received counseling/treatment for drug/alcohol use;
- percent of out-migration in the past 5 years;
- percent of in-migration in the past 5 years;
- number per one thousand arrested and booked for violent offenses;
- number per one thousand arrested and booked for property crime;
- number per one thousand arrested and booked for nonindex crime;
- percent of population that is while males;
- percent of population that is black males;
- percent of population that is black females;
- percent of population that is other race males;
- percent of population that is other race females;
- percent of population that is urban;
- percent of population that is living below poverty line;
- percent of population that are high school drop outs.

The 15 outcomes for which estimates are provided are the same as those in Tables 3.5 through 3.8. The outcomes are:

1. number of people who drank 5 or more drinks at least once in the past 30 days;
2. number of people who drank 5 or more drinks on 5 or more occasions in the past 30 days;
3. number of people who got drunk five or more times in the past year;

4. number of people who experienced negative consequences associated with drinking in the past year;

5. number of people who need alcohol treatment or intervention;

6. illicit drug use in the past year;

7. illicit drug use in the past month;

8. frequent illicit drug use in the past year;

9. number of people who experienced negative consequences associated with illegal drug use in the past year;

10. the need for drug treatment or intervention;

11. marijuana use in the past year;

12. marijuana use in the past month;

13. frequent marijuana use in the past year;

14. number of people who experienced negative consequences associated with marijuana use in the past year;

15. the need for alcohol and/or drug treatment or intervention.